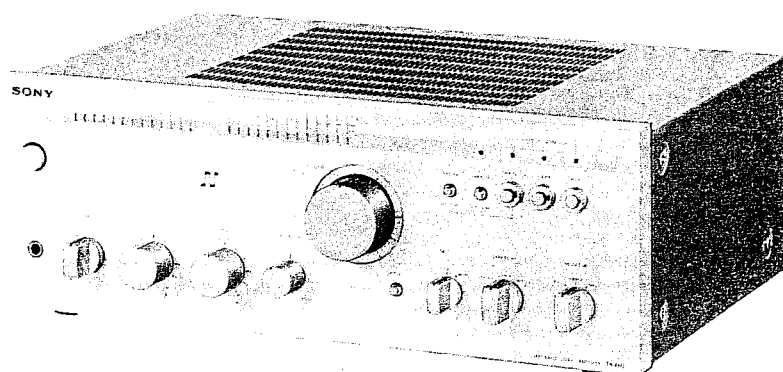


TA-F60

US Model
Canadian Model
AEP Model
UK Model
PX Model



INTEGRATED STEREO AMPLIFIER



SPECIFICATIONS


GENERAL

Power Requirements:	120 V ac, 60 Hz (US, Canadian model) 220 V ac ~, 50/60 Hz (AEP model) 240 V ac ~, 50/60 Hz (UK model) 110, 120, 220 or 240 V ac, 50/60 Hz (PX model)
Power Consumption:	120 W (US model) 190 W (Canadian model) 310 W (AEP, PX model) 420 W (UK model)
Dimensions:	Approx. 430 (w) x 155 (h) x 340 (d) mm 17 (w) x 6 ¹ / ₈ (h) x 13 ¹ / ₂ (d) inches including projecting parts and controls
Weight:	Approx. 6.7 kg, 14 lb 12 oz (net) Approx. 7.7 kg, 17 lb (in shipping carton)


POWER AMPLIFIER SECTION

Power Output and Total Harmonic Distortion:	With 8 Ω loads, both channels driven, from 20–20,000 Hz; rated 75 W per channel minimum RMS power, with no more than 0.01 % total harmonic distortion from 250 mW to rated output. (US, Canadian model)
Continuous RMS Power Output: (Less than 0.01 % THD, both channels driven simultaneously)	At 20 Hz–20 kHz 75 W + 75 W (8 Ω) According to DIN 45500 75 W + 75 W (8 Ω) (AEP, UK, PX model)
Power Bandwidth (IHF):	5 Hz – 30 kHz (37.5 W output, 0.01 % THD, 8 Ω) (AEP, UK, PX model)
Harmonic Distortion:	Less than 0.01 % at rated output Less than 0.008 % at 10 W output
Intermodulation (IM) Distortion: (60 Hz : 7 kHz = 4 : 1)	Less than 0.01 % at rated output Less than 0.008 % at 10 W output

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY SHADING AND MARK  ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

ATTENTION AU COMPOSANT AYANT RAPPORT À LA SÉCURITÉ:

LES COMPOSANTS IDENTIFIÉS PAR UN TRAMÉ ET UNE MARQUE  SUR LES DIAGRAMMES SCHEMATIQUES, LES VUES EXPLOSÉES ET LA LISTE DES PIÈCES SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT. NE REMPLACER CES COMPOSANTS QUE PAR DES PIÈCES SONY DONT LES NUMÉROS SONT DONNÉS DANS CE MANUEL OU DES SUPPLÉMENTS PUBLIÉS PAR SONY.

— Continued on next page —

SONY
SERVICE MANUAL

TA-F60

Residual Noise: Less than 150 μ V (8 Ω , network A)
Damping Factor: 40 (8 Ω , 1 kHz)
Outputs: SPEAKER terminals A, B
Accept speakers of 8 – 16 Ω
HEADPHONES jack
Accepts low and high-impedance stereo headphones

PREAMPLIFIER SECTION

Frequency Response: PHONO: RIAA equalization curve ± 0.2 dB
TUNER
AUX
TAPE 1, 2) 3 – 70,000 Hz $^{+0}_{-1}$ dB

Tone Controls: BASS
 ± 10 dB at 60 Hz
(turnover frequency 300 Hz)
TREBLE
 ± 10 dB at 25 kHz
(turnover frequency 5 kHz)

Filters: LOW
6 dB/octave attenuation below 15 Hz

Loudness: +10 dB at 60 Hz, +6 dB at 25 kHz
(att. 30 dB)

Inputs:

	Sensitivity	Impedance	Phono overload (1 kHz)	S/N (weighting network, input level)
PHONO (MC)	0.25 mV (–70 dB)	100 Ω	25 mV (–30 dB)	75 dB (A, 0.25 mV)
PHONO 2 (MM)	2.5 mV (–50 dB)	50 k Ω	250 mV (–10 dB)	88 dB (A, 2.5 mV)
TUNER AUX TAPE 1, 2	150 mV (–14.5 dB)	50 k Ω	—	100 dB (A, 150 mV)

Outputs:

	Voltage	Impedance
REC OUT 1, 2	150 mV (–14.5 dB) (13.5 V at max.)	4.7 k Ω

0 dB = 0.775 V

MODEL IDENTIFICATION

– Specification Label –

US model

SONY®	INTEGRATED STEREO AMPLIFIER Model NO. TA-F60
AC 120 V	60 Hz 120 W
SERIAL NO.	
	MADE IN JAPAN

UK model

SONY®	INTEGRATED STEREO AMPLIFIER Model NO. TA-F60
AC 240 V ~	50/60 Hz 420 W
SERIAL NO.	
	MADE IN JAPAN

Canadian model

SONY®	INTEGRATED STEREO AMPLIFIER Model NO. TA-F60
AC 120 V	60 Hz 190 W
SERIAL NO.	
	MADE IN JAPAN

PX1 model

SONY®	INTEGRATED STEREO AMPLIFIER Model NO. TA-F60
AC 110, 120, 220, 240 V ~	50/60 Hz 310 W
SERIAL NO.	
	MADE IN JAPAN

AEP model

SONY®	INTEGRATED STEREO AMPLIFIER Model NO. TA-F60
AC 220 V ~	50/60 Hz 310 W
SERIAL NO.	
	MADE IN JAPAN

PX2 model

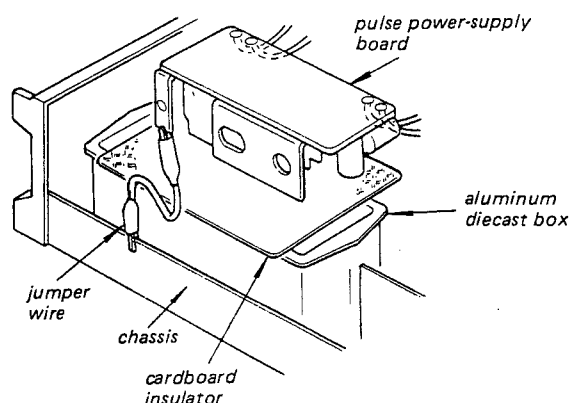
ASCO	SONY® INTEGRATED STEREO AMPLIFIER Model NO. TA-F60
	AC 110, 120, 220, 240 V ~ 50/60 Hz 310 W
	SERIAL NO.
	MADE IN JAPAN

SERVICING NOTE

1. PULSE POWER SUPPLY BOARD REPAIRING

This set has a pulse power-supply circuit which is quite different from a conventional power-supply circuit. The pulse power supply directly rectifies and smooths the ac input power to produce the higher dc voltages required in the power supply circuit. When servicing this set, note the following.

- a) To prevent unwanted radiation due to pulse signals in the pulse power-supply circuit, the pulse power-supply board is shielded by the aluminum diecast box.
- b) The negative circuit of the secondary rectifier in the pulse power-supply circuit is grounded by screws in the aluminum diecast box. When checking the pulse power-supply board out of the box, use a jumperwire and a cardboard insulator as shown on the right.



2. Take care that electrolytic capacitor C414 which is used after the rectification of ac power source voltage is charged even if the POWER switch is turned off. Be sure to use a resistor of at least several hundred ohms to discharge the capacitor. Direct discharge by means of lead is dangerous.

3. INVERTER CIRCUIT TRANSISTOR REPLACEMENT (Q903–906)

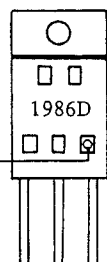
When replacing Q903–Q906 in the pulse power-supply circuit, use those which have the same hFE rank and color code.

US, Canadian model

Q903–906

25C1968D-O --- O

hFE rank

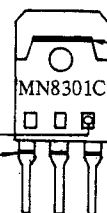
Color Code
(black
blue
green
red)

AEP, UK, PX model

Q903, 904

MN8301C --- O

hFE rank

Color Code
(black
blue
green
red)

MEMO

[illegible]

SECTION 1

OUTLINE

1-1. HEAT PIPE

Model TA-F60 uses a heat pipe as the heat conduction element for dissipating the heat generated by the power transistors. The principle and construction of the heat pipe are described below.

The heat pipe is a conduction element of superior thermal conduction characteristics designed for disposing of the heat in connection with spacecraft and aircraft. It is composed of special fluid enclosed in an airtight container, which has a reduced internal pressure.

The operation principle of the heat pipe is illustrated in Fig. 1. One end of the pipe is the heat input section (evaporation section), and the other end is the heat output section (condensation section). As heat is applied to the heat input section, the fluid in that section is evaporated and conveyed to the heat output section. Since it radiates heat, the vapor in the heat output section condenses, restores the state of fluid and returns to the heat input section. The cycle of the above processes is performed continuously. As a result, heat conduction is possible at a very high velocity.

The apparent thermal conductivity of the heat pipe used as the conduction element for the heat dissipation of power transistor is several hundred times as high as that of the aluminum or copper conventionally used as the material of heat sink. For this reason, a heat pipe has a cooling capacity 50 % higher than a heat sink. Use of the heat pipe also permits the power transistor to be cooled without detaching it from the circuit board, and as the result, the electromagnetic waves generated by the large signal current flowing in the leads are much decreased, and the distortion factor characteristic and signal-to-noise ratio of the power amplifier are improved.

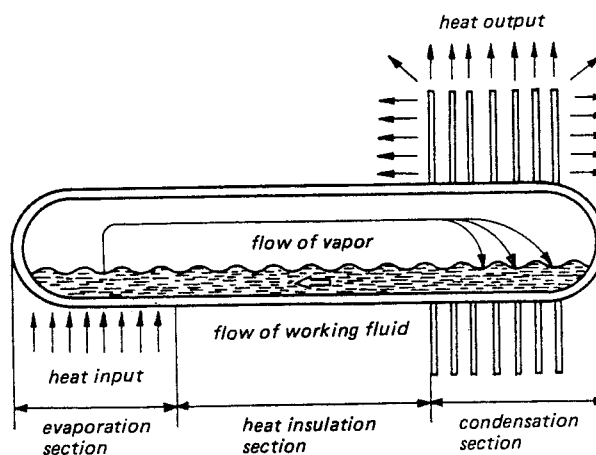


Fig. 1

1-2. LED PEAK LEVEL METER CIRCUIT

For indication of the output power, Model TA-F60 uses light-emitting diodes (LED). This LED peak level meter is described below.

- (1) When the power switch is turned on, LED D111-1 (0 W) is lit.
- (2) The input signal is logarithmically compressed by operational amplifier IC103 according to the square-law characteristic of diodes D108 and D109.
- (3) The logarithmically compressed input signal is rectified by D110 and charges C169 for peak detection.
- (4) The anode voltage of diode D310 as divided by means of R316, R317 and R318 is applied as a reference voltage to the terminals (3) and (20) of IC104.
- (5) The reference voltage is divided into 12 parts by means of R1 to R13 in IC104, and the 12 divisional voltages are applied as the reference voltages for the LED-driving differential amplifiers, respectively.
- (6) If there is an input signal of, for example, 0.005 W in output power, the voltage to which C169 is charged with the logarithmically compressed and rectified input signal is applied to the terminal (21) of IC104, making the base voltage of Q2 higher than the base voltage (reference voltage) of Q1. This causes the collector voltage of Q2 to decrease. Then, the LED driving circuit turns on to light LED D111-2 (0.005 W). The other LEDs D111-3, D111-4, are not lit because the base voltages (reference voltages) of Q3, Q5, are higher than the base voltages of Q4, Q6, . . . , respectively.
- (7) As in the foregoing, the peak level voltage charged in C169 is compared with the reference voltage in each LED-driving differential amplifier, and if the peak level voltage becomes higher than the reference voltage, the corresponding LED (D111-2 to D111-13) is lit to indicate the output power of Model TA-F60.

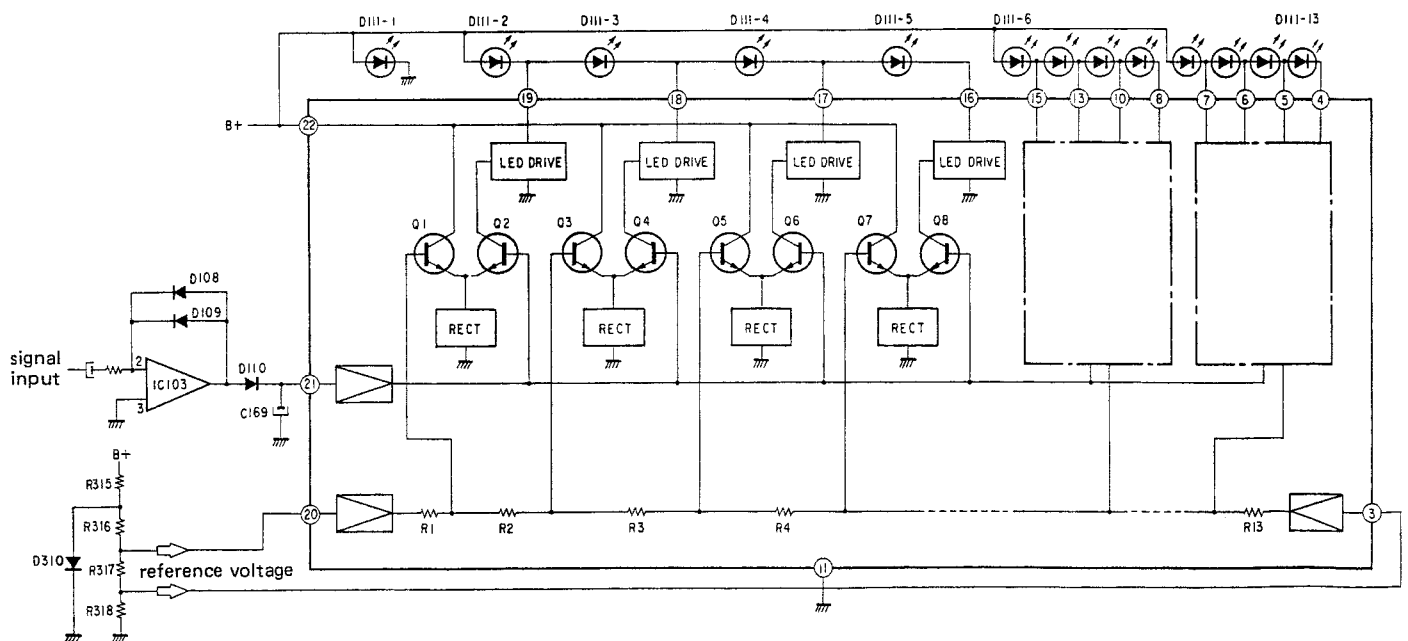
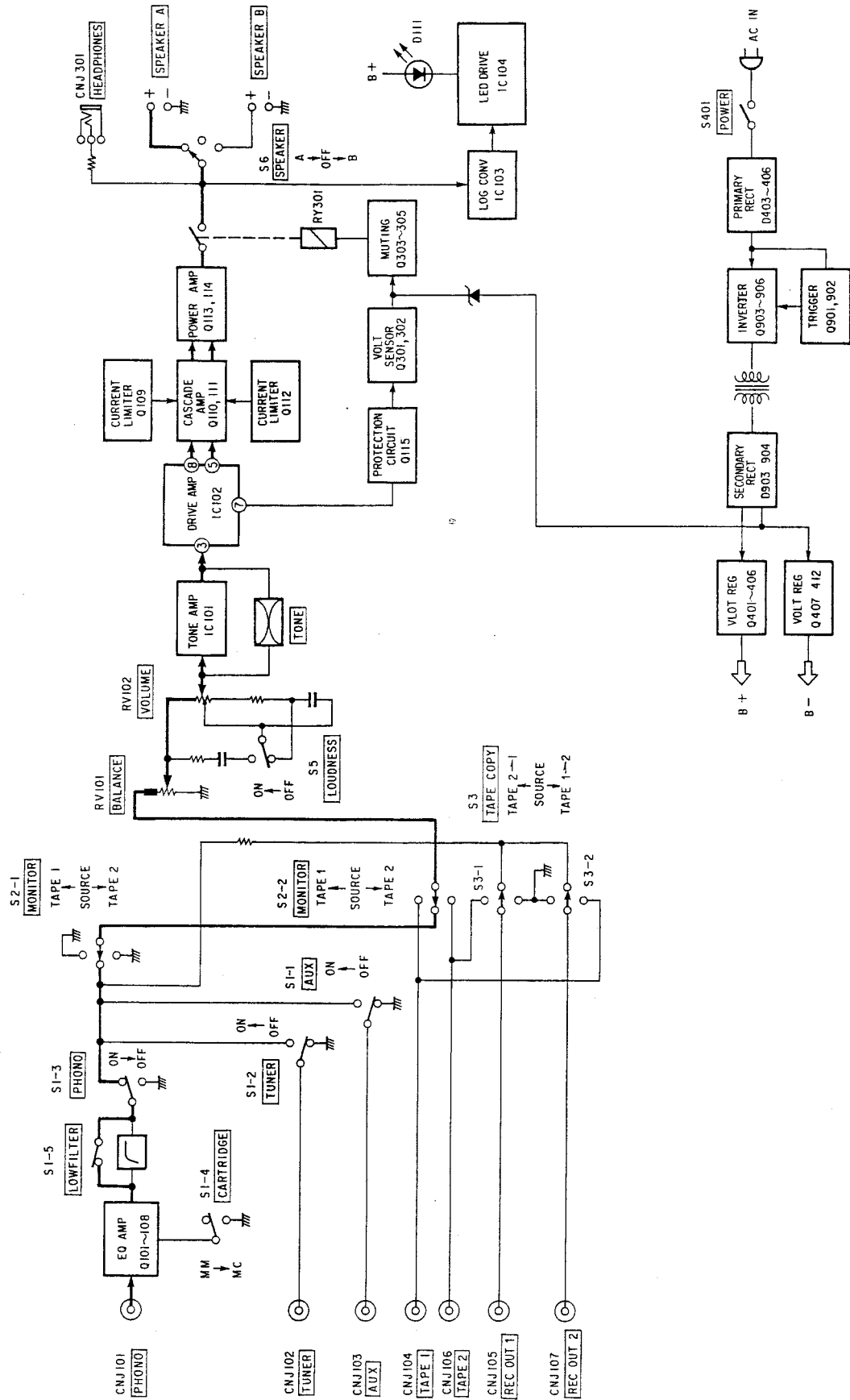


Fig. 2

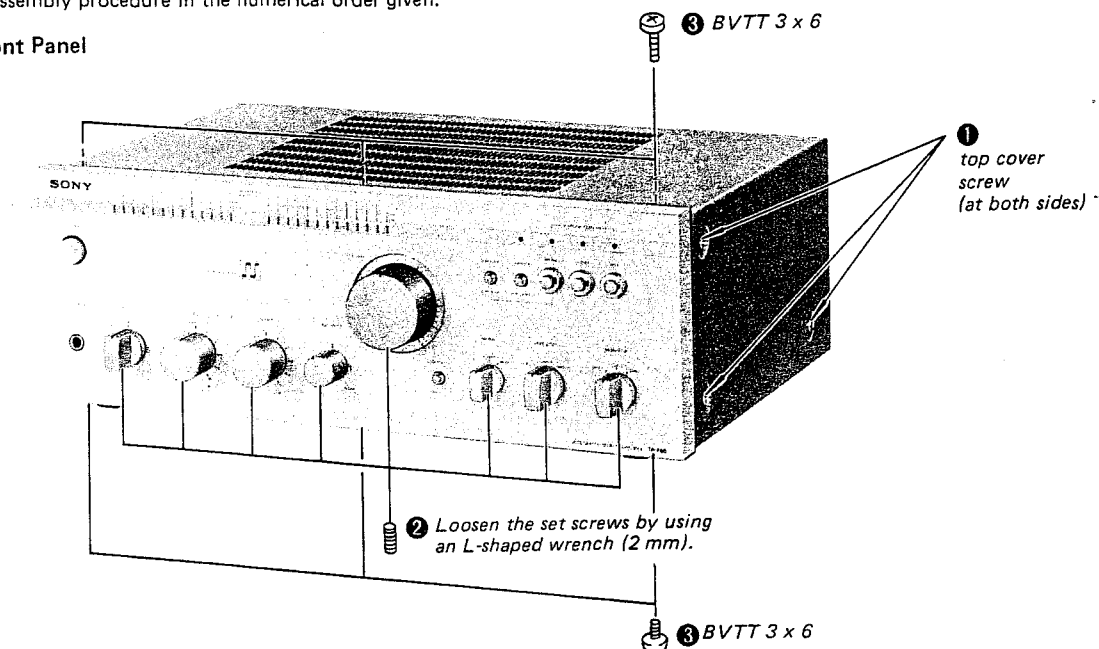
1-3. BLOCK DIAGRAM



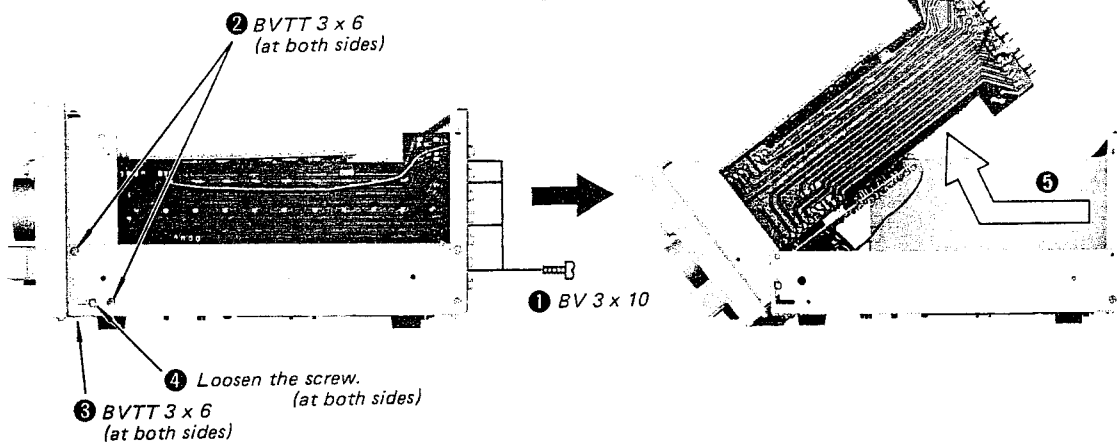
SECTION 2 DISASSEMBLY

Note: Follow the disassembly procedure in the numerical order given.

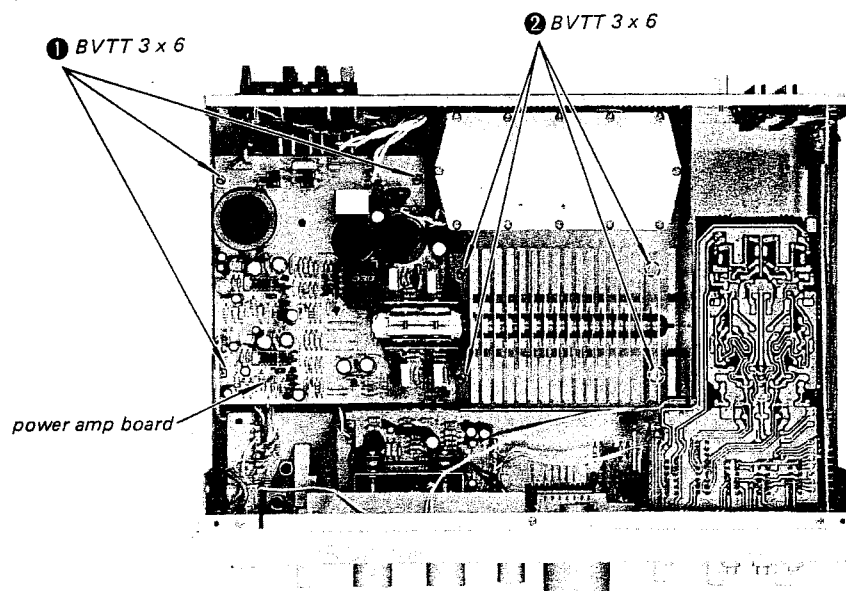
Top Cover and Front Panel



Circuit Board Check



Power Amp Board



SECTION 3 ADJUSTMENTS

Note:

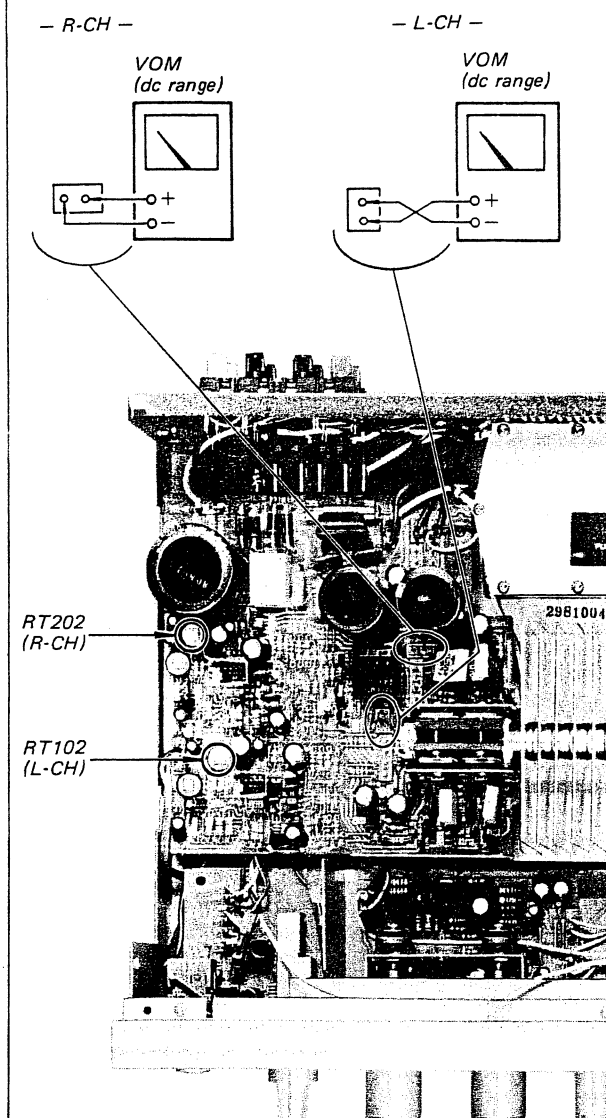
1. DC BIAS and DC BALANCE adjustments should be made several minutes later after the POWER switch is turned on (POWER ON.).
2. Make DC BIAS adjustment first.
3. Repeat DC BIAS and DC BALANCE adjustments two or three times.
4. After replacing the power transistors, DC BIAS and DC BALANCE adjustments should be made.

DC Bias Adjustment

Procedure:

Adjust RT102 (L-CH) and RT202 (R-CH) for 22 mV readings with no signal input.

Adjustment Location:

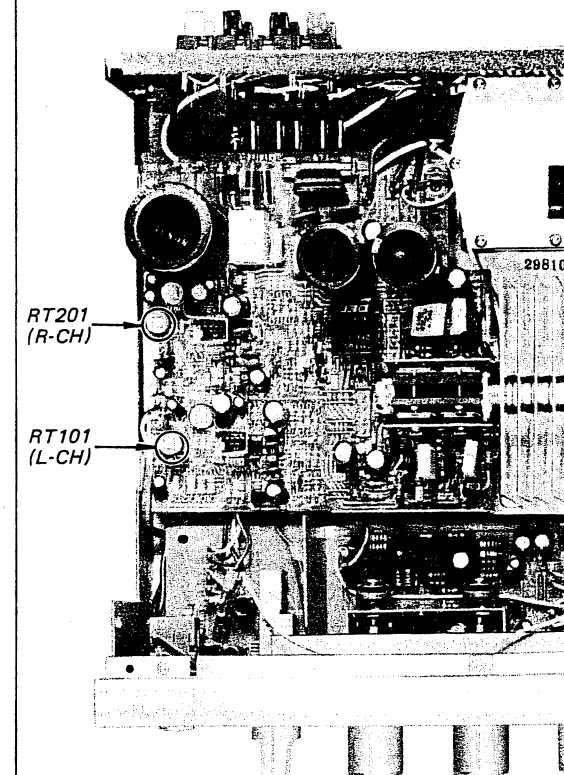
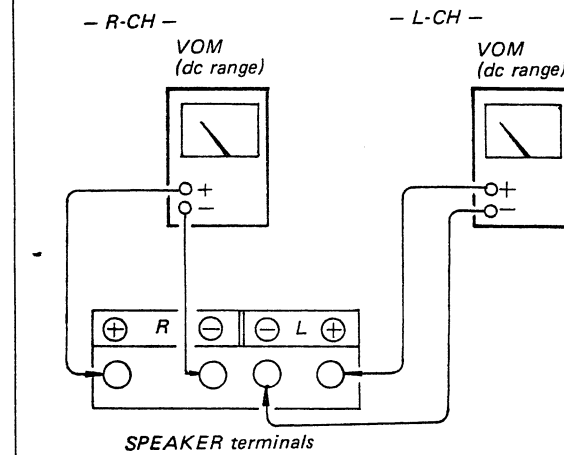


DC Balance Adjustment

Procedure:

Adjust RT101 (L-CH) and RT201 (R-CH) for 0 V readings with no signal input.

Adjustment Location:

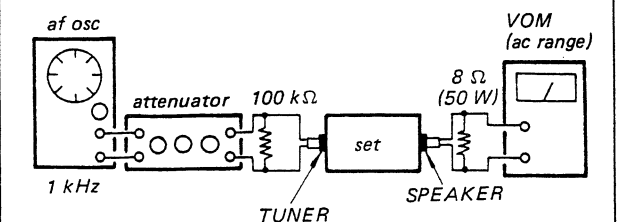


Meter Level Adjustment

Setting:

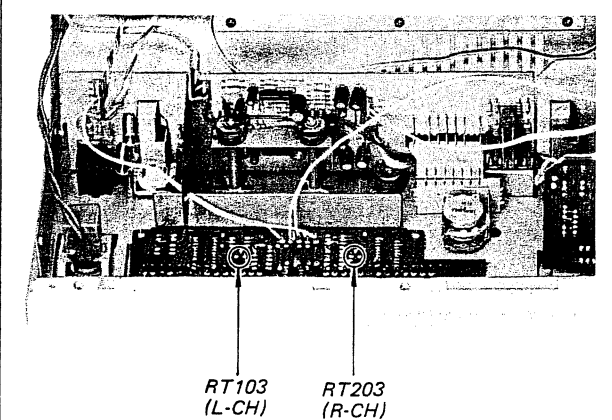
FUNCTION switch: TUNER

Procedure:



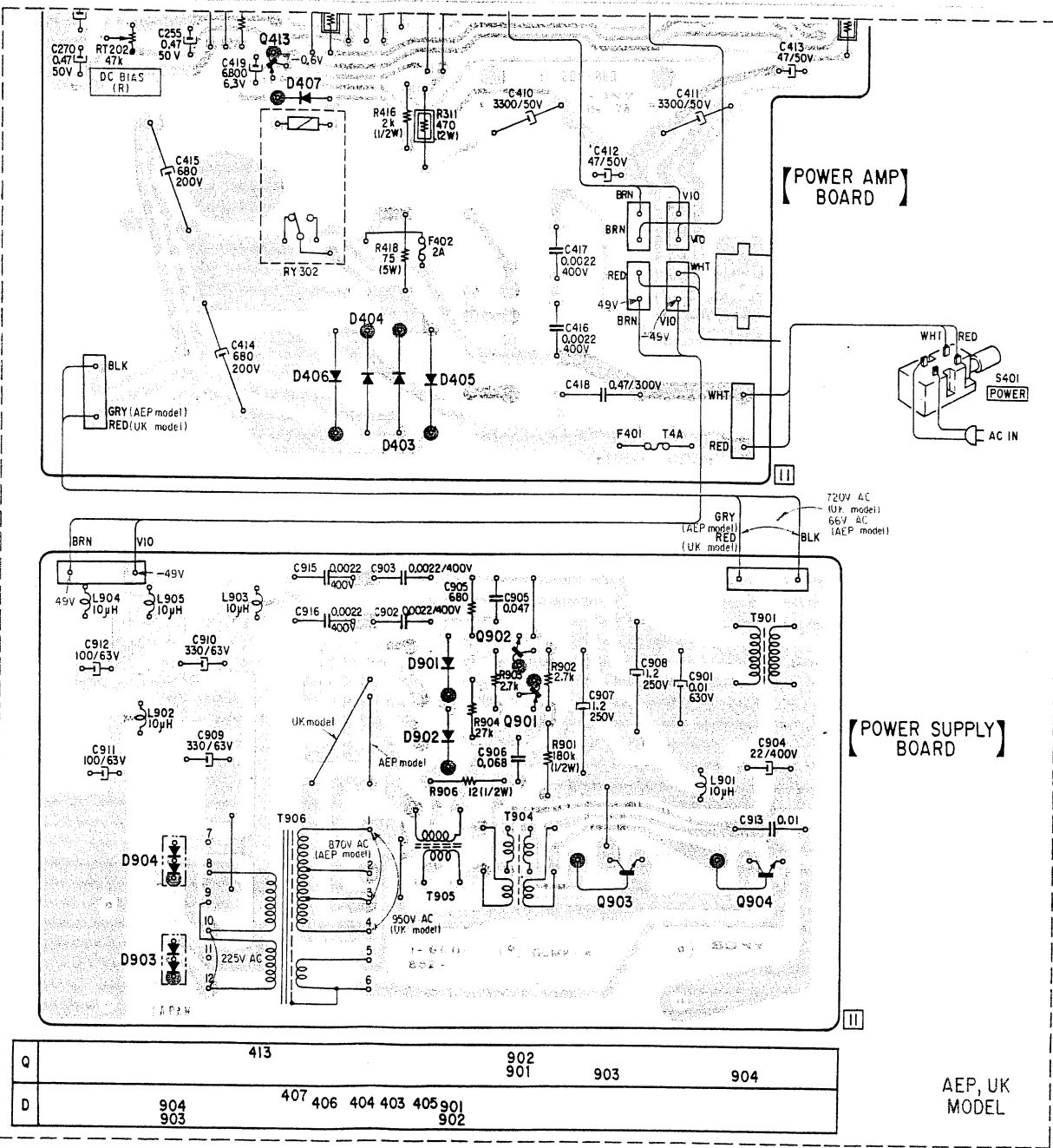
1. Turn the VOLUME control fully clockwise.
2. Adjust the attenuator so that the VOM reads 8 W (8 V).
3. Adjust RT103 (L-CH) and RT203 (R-CH) so that the 10 W indicator (3rd LED from right) begins to turn on.
4. Confirmation:
 - 30 W indicator turns on when the VOM indicates 30 W (15.5 V).
 - 0.01 W indicator turns on when the VOM indicates 0.01 W (0.283 V).

Adjustment Location:



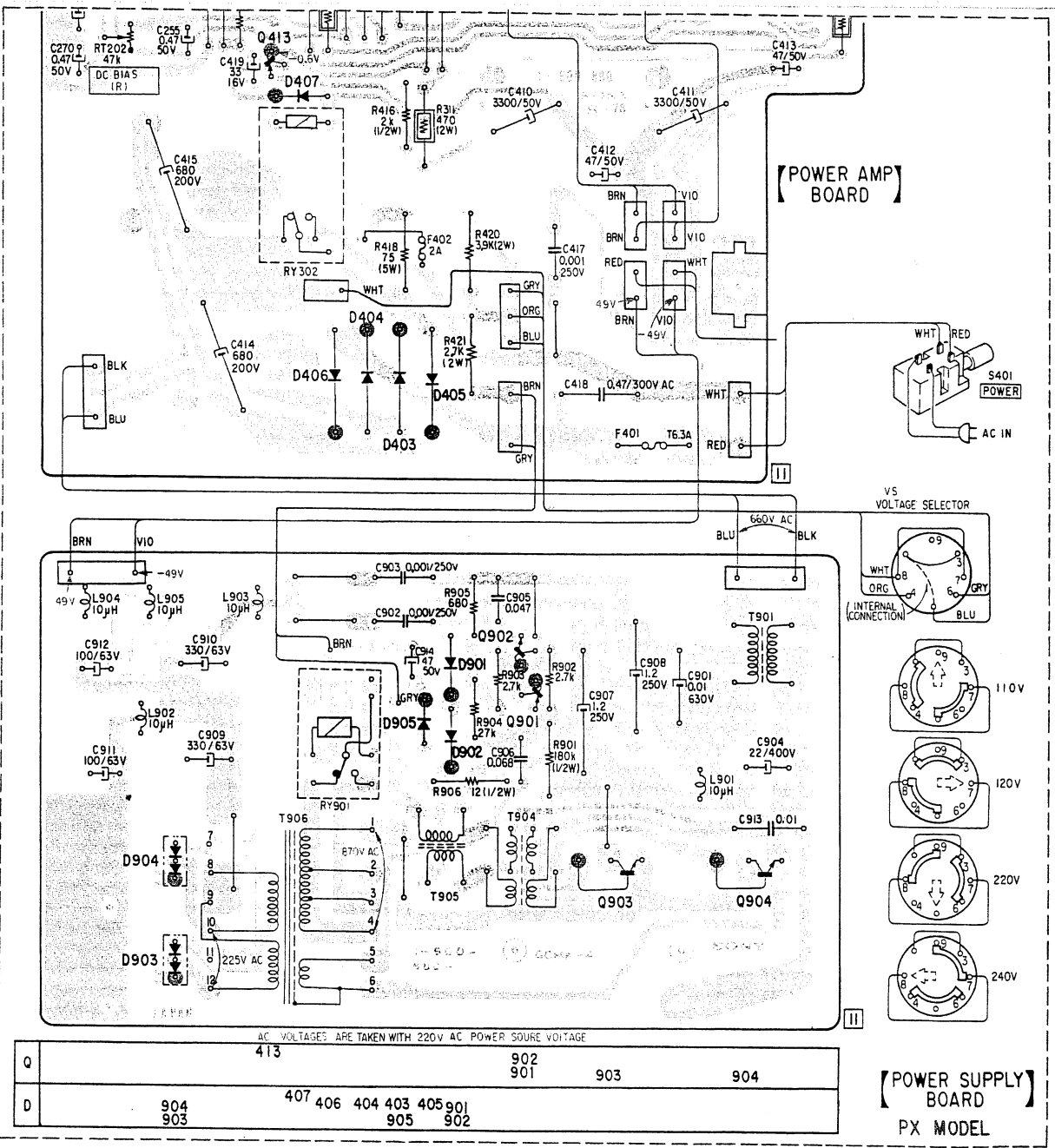
SECTION 4
DIAGRAMS

4-1. MOUNTING DIAGRAM — Power Amp Board and Power Supply Board —
— Conductor Side —
(AEP, UK model)



Note:
• B+ pattern
• B- pattern

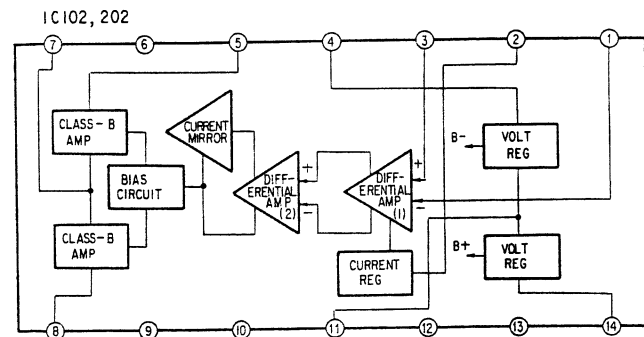
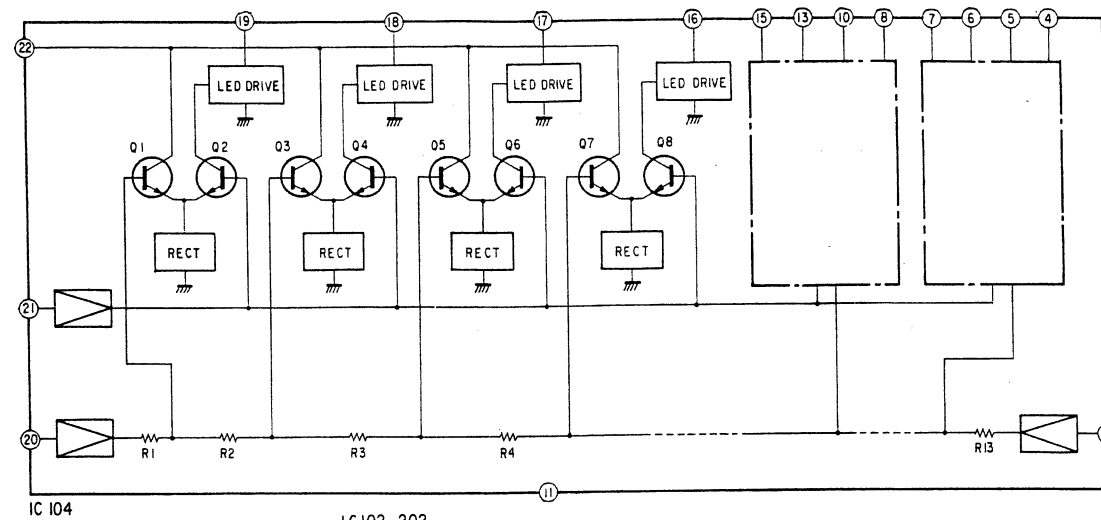
4-2. MOUNTING DIAGRAM — Power Amp Board and Power Supply Board —
— Conductor Side —
(PX model)



Note:
• B+ pattern
• B- pattern

4-3. MOUNTING DIAGRAM Replacement Semiconductors: See page 21.

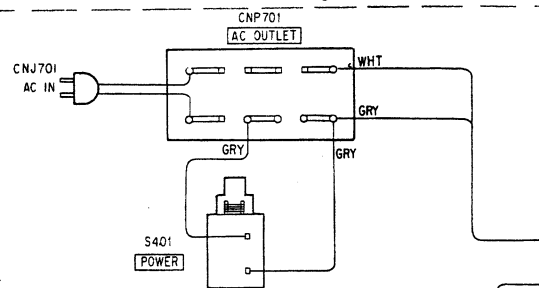
— Conductor Side —



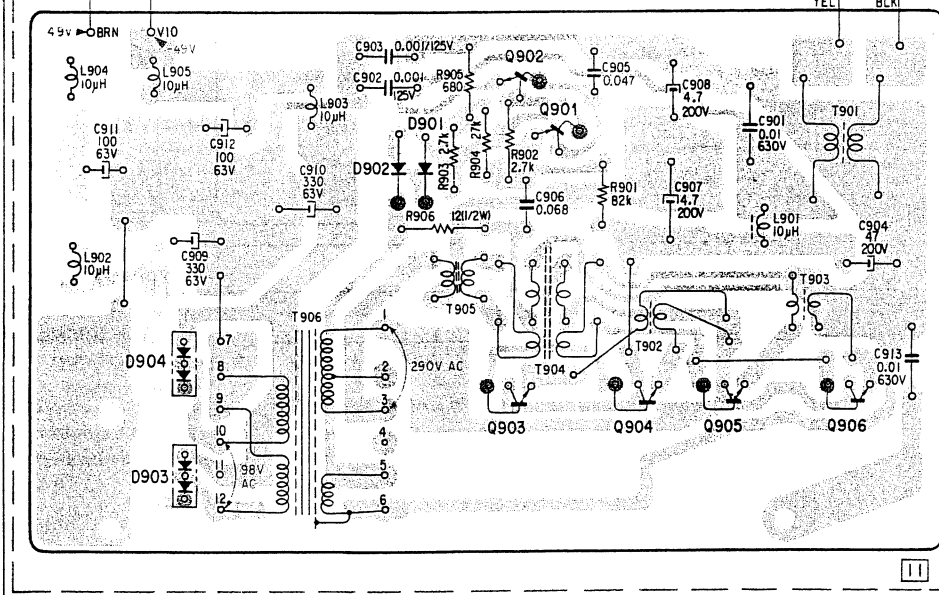
US, CANADIAN MODEL

AEP, UK MODEL (See page 11)

PX MODEL (See page 12)

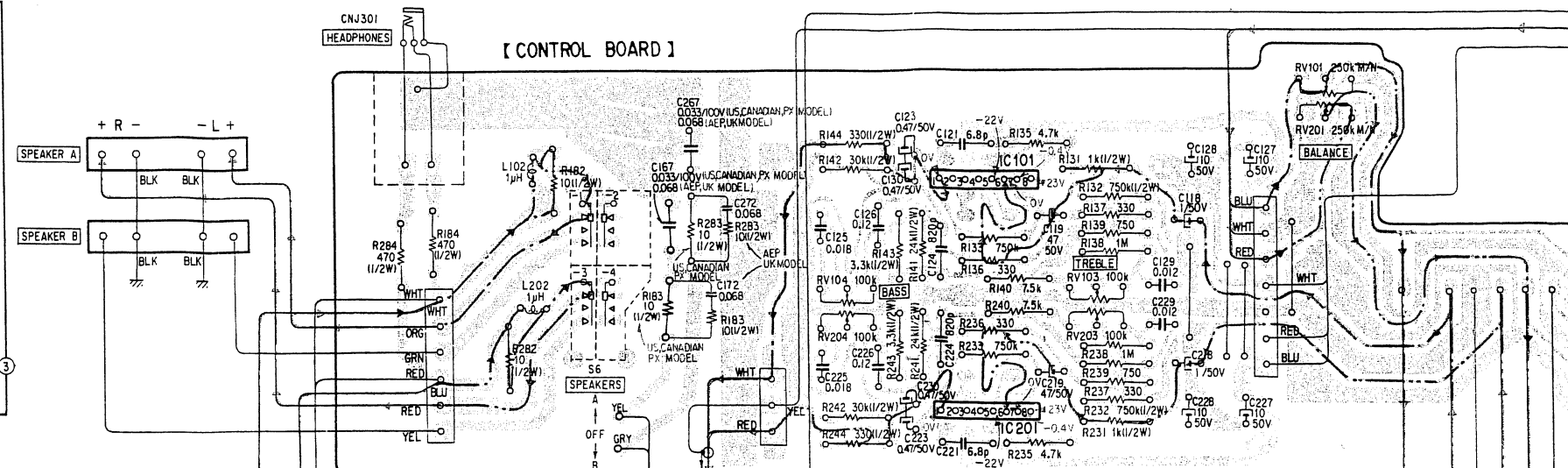


[POWER SUPPLY BOARD]

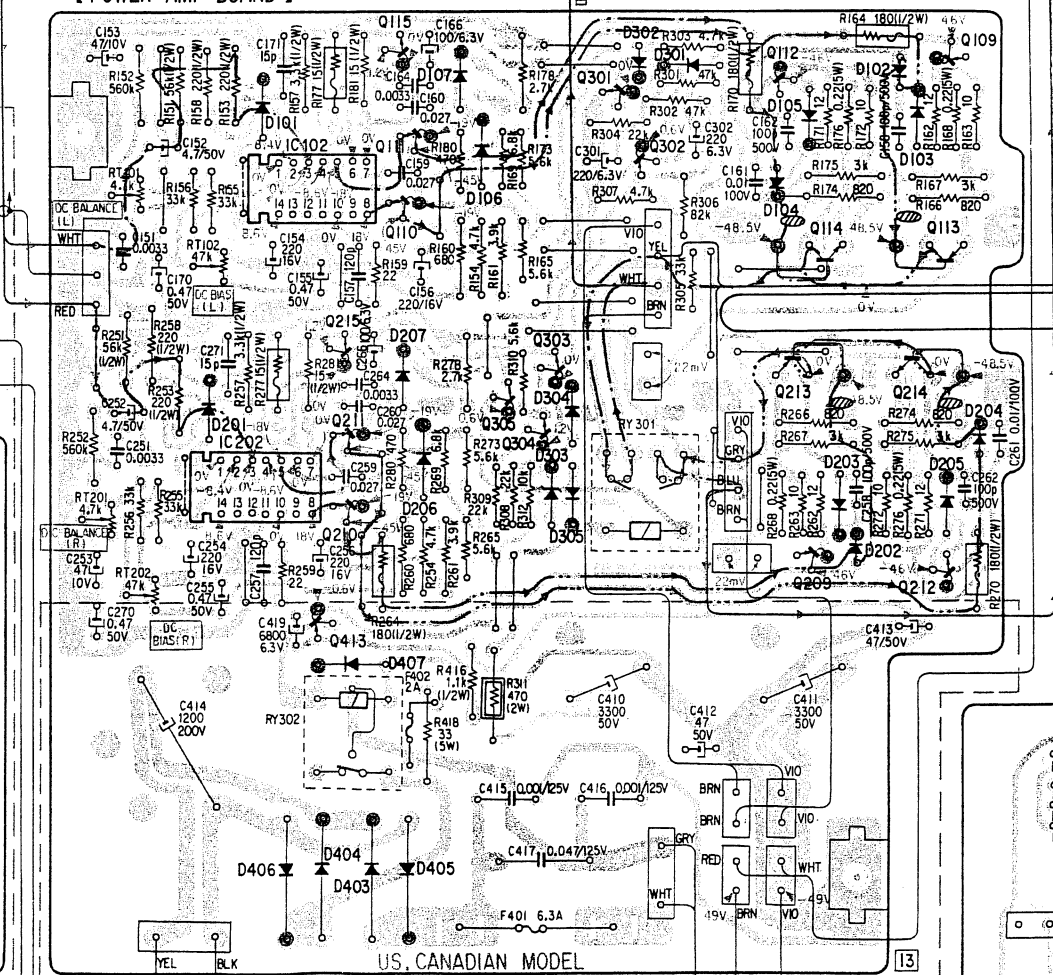


Q		902, 901			
D	904, 905	902, 901	903	904	905, 906

TA-F60 TA-F60

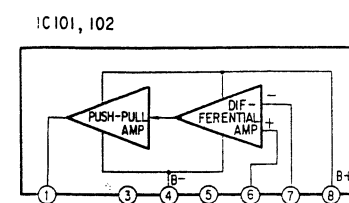


[POWER AMP BOARD]



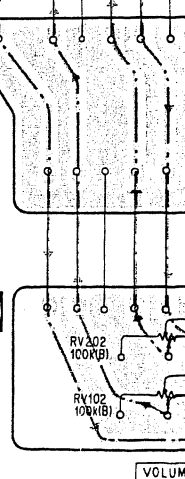
AEP, UK MODEL (See page 11)

PX MODEL (See page 12)

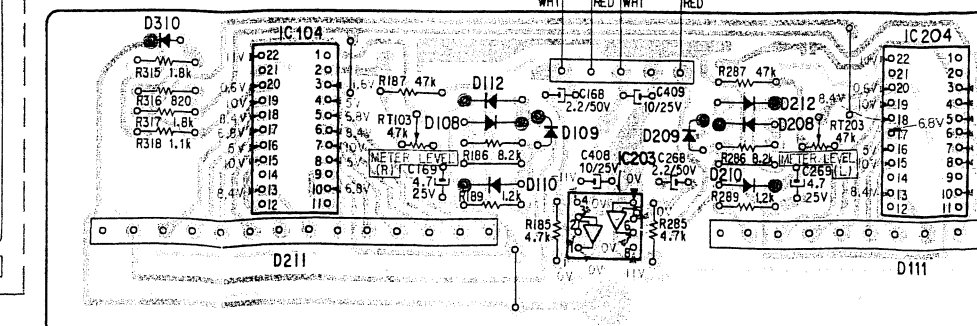


[TERMINAL BOARD]

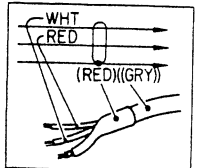
[VOLUME CONTROL BOARD]



[LED METER BOARD]

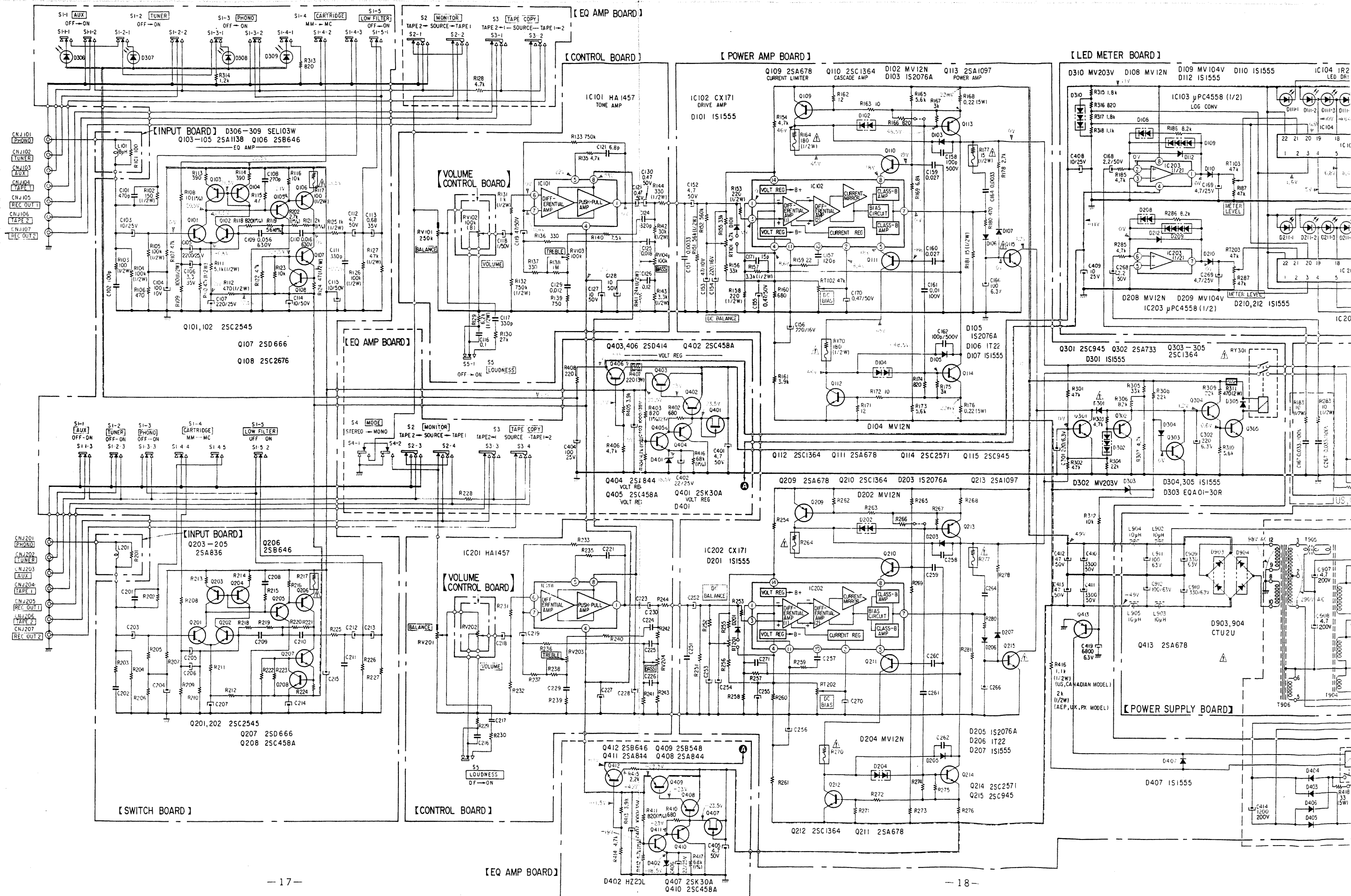


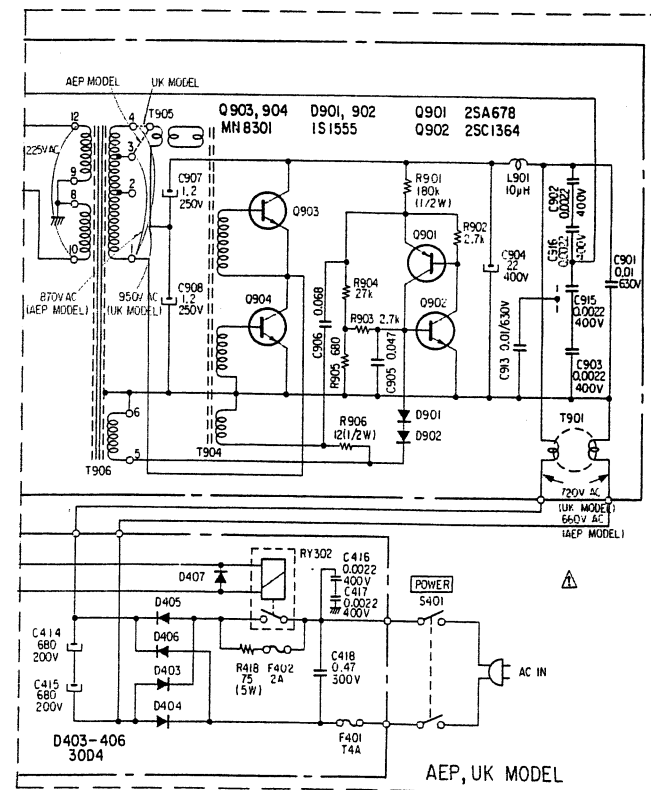
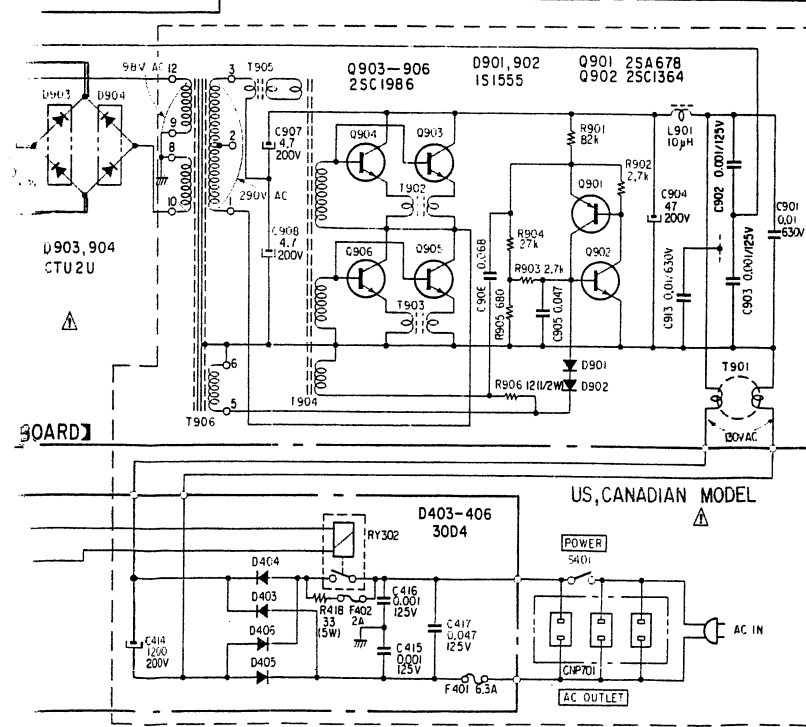
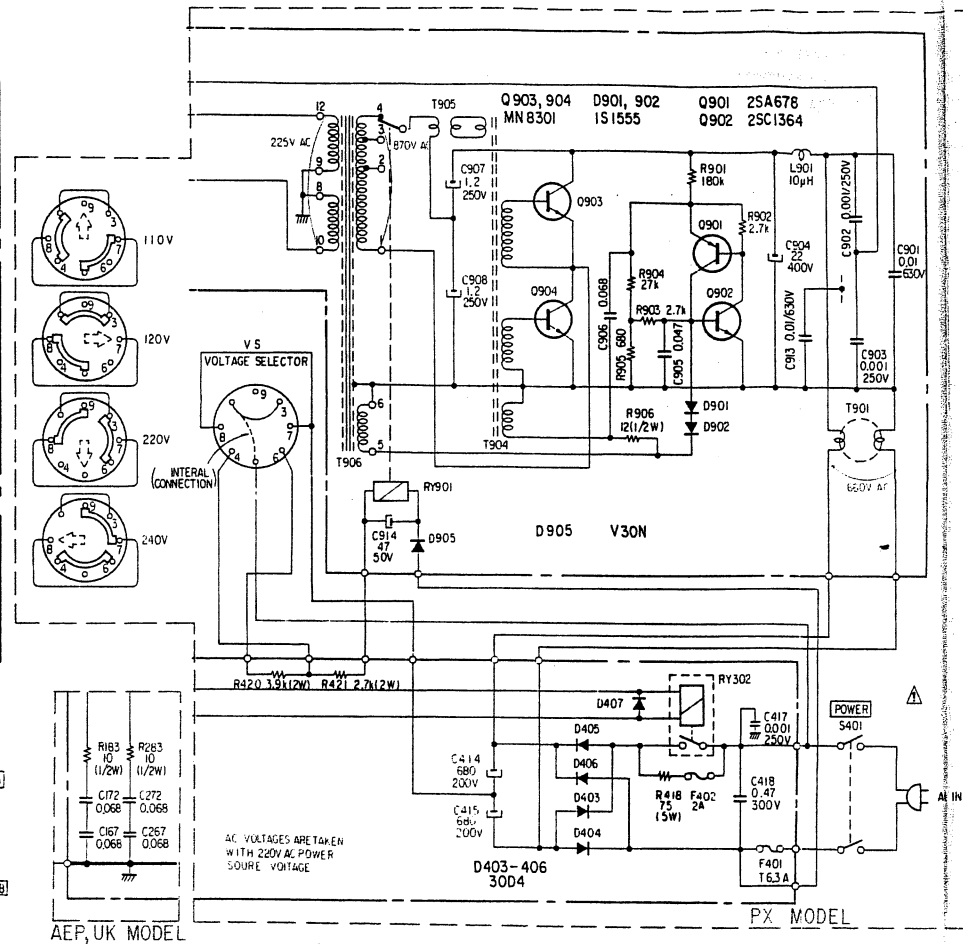
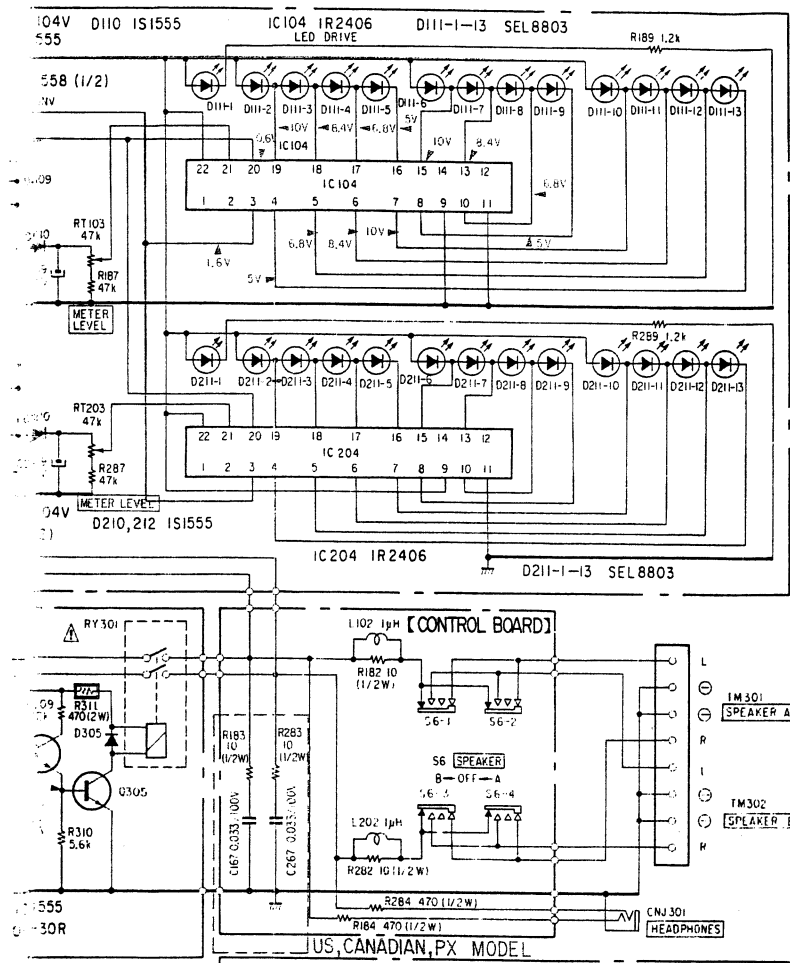
IC	104		203		204
D	310, 211	112, 109, 108, 110	209, 212, 208, 210		111









4-4. SCHEMATIC DIAGRAM

TA-F60 TA-F60







Note:

- All capacitors are in μF unless otherwise noted. $\text{pF} : \mu\text{F}$ 50WV or less are not indicated except for electrolytics and tantalum.
- All resistors are in ohms, $\frac{1}{4}\text{W}$ unless otherwise noted. $\text{k}\Omega : 1000 \Omega$, $\text{M}\Omega : 1000 \text{k}\Omega$
-  : nonflammable resistor.
-  : fusible resistor.
-  : panel designation.
-  : adjustment for repair.
- Readings are taken under no-signal conditions with a VOM (20 $\text{k}\Omega/\text{V}$).
-  : B+ bus.
-  : B- bus.

Ref. No.	Switch	Position
S1-1	AUX	OFF
S1-2	TUNER	OFF
S1-3	PHONO	ON
S1-4	CARTRIDGE	MM
S1-5	LOW FILTER	OFF
S2	MONITOR	SOURCE
S3	TAPE COPY	SOURCE
S4	MODE	STEREO
S5	LOUDNESS	OFF
S6	SPEAKERS	A

Note: The components identified by shading and mark  are critical for safety. Replace only with part number specified.

Note: Les composants identifiés par un tramé et une marque  sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

For replacement, use semiconductors except in ().

Q110, 210
Q112, 212
Q303—305, 902 } : 2SC1364

A schematic diagram of a three-terminal electronic component, likely a vacuum tube or transistor. It features a cylindrical base with three vertical pins extending downwards. The pins are labeled from left to right as E, C, and B.

A diagram of a single fiber, showing a cylindrical body with a central core. The label 'F' points to the outer cladding, and 'G' points to the central core.

A diagram of a three-bladed propeller. The top view shows a circular hub with three blades extending from it. The blades are labeled B, C, and E. Blade B is on the left, blade C is on the top right, and blade E is on the bottom right. The side view shows the propeller's profile, with a central hub and three blades extending downwards. The blades are labeled B, C, and E.

The diagram shows a three-toothed key. The left view is a perspective drawing of the key with three teeth. The right view is a circular cross-section of the key, showing a central hole. Labels B, C, and E point to the three teeth in the perspective view. In the cross-section, label C points to the top of the central hole, B points to the left side of the hole, and E points to the right side of the hole.

The diagram shows a three-core cable. On the left is a longitudinal view showing three conductors labeled S, G, and D. On the right is a cross-sectional view of the cable, showing a central conductor labeled G and two outer conductors labeled S and D.


A schematic diagram of a BLU (Backlight Unit) showing a cathode, anode, and a BLU component.

Diagram of a vacuum tube diode. The top electrode is labeled "cathode" and the bottom electrode is labeled "anode". A filament is shown on the left, and a control grid is shown on the right.

anode cathode

A schematic diagram of a diode symbol. It consists of a triangle pointing towards a vertical line. The vertical line has a small gap in the middle. The top of the triangle is labeled 'cathode' and the bottom of the vertical line is labeled 'anode'.

The diagram shows a three-terminal diode package on the left, with terminals labeled 1, 2, and 3. Terminal 1 is the top terminal, terminal 2 is the middle terminal, and terminal 3 is the bottom terminal. To the right, the internal circuit is shown as two diodes connected in series between terminals 1 and 3, with terminal 2 connected to the junction between the two diodes.



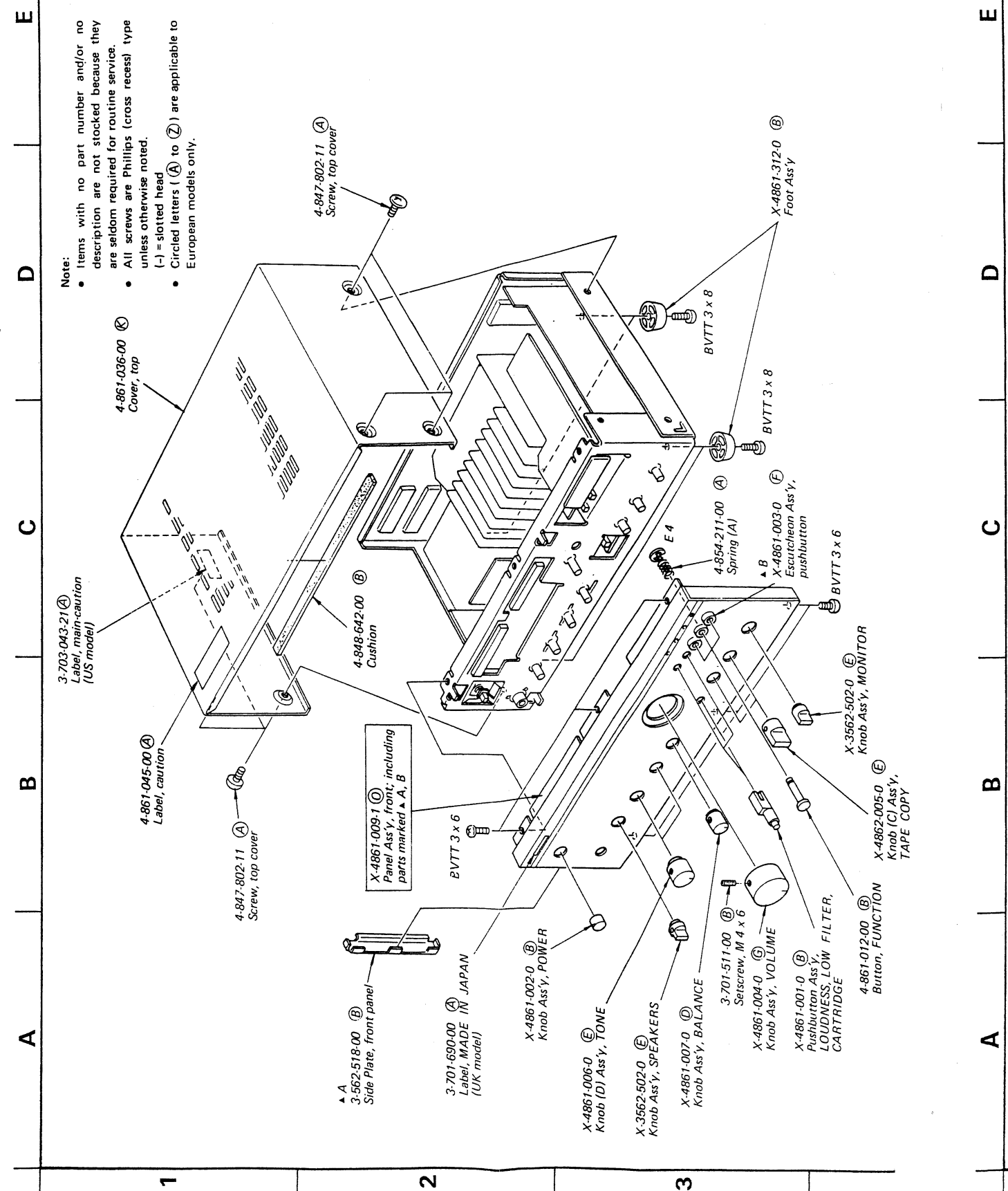
(Top view)

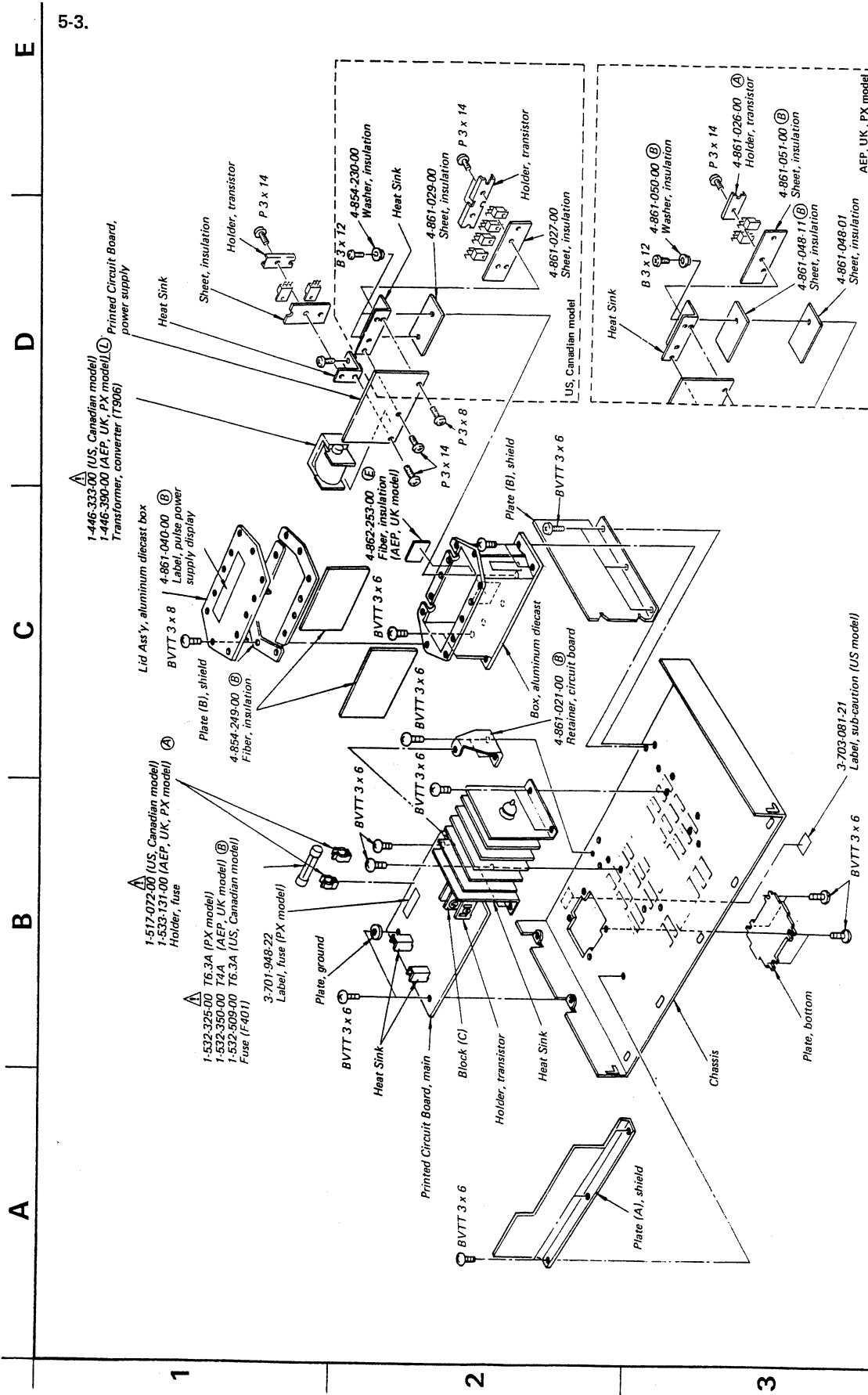
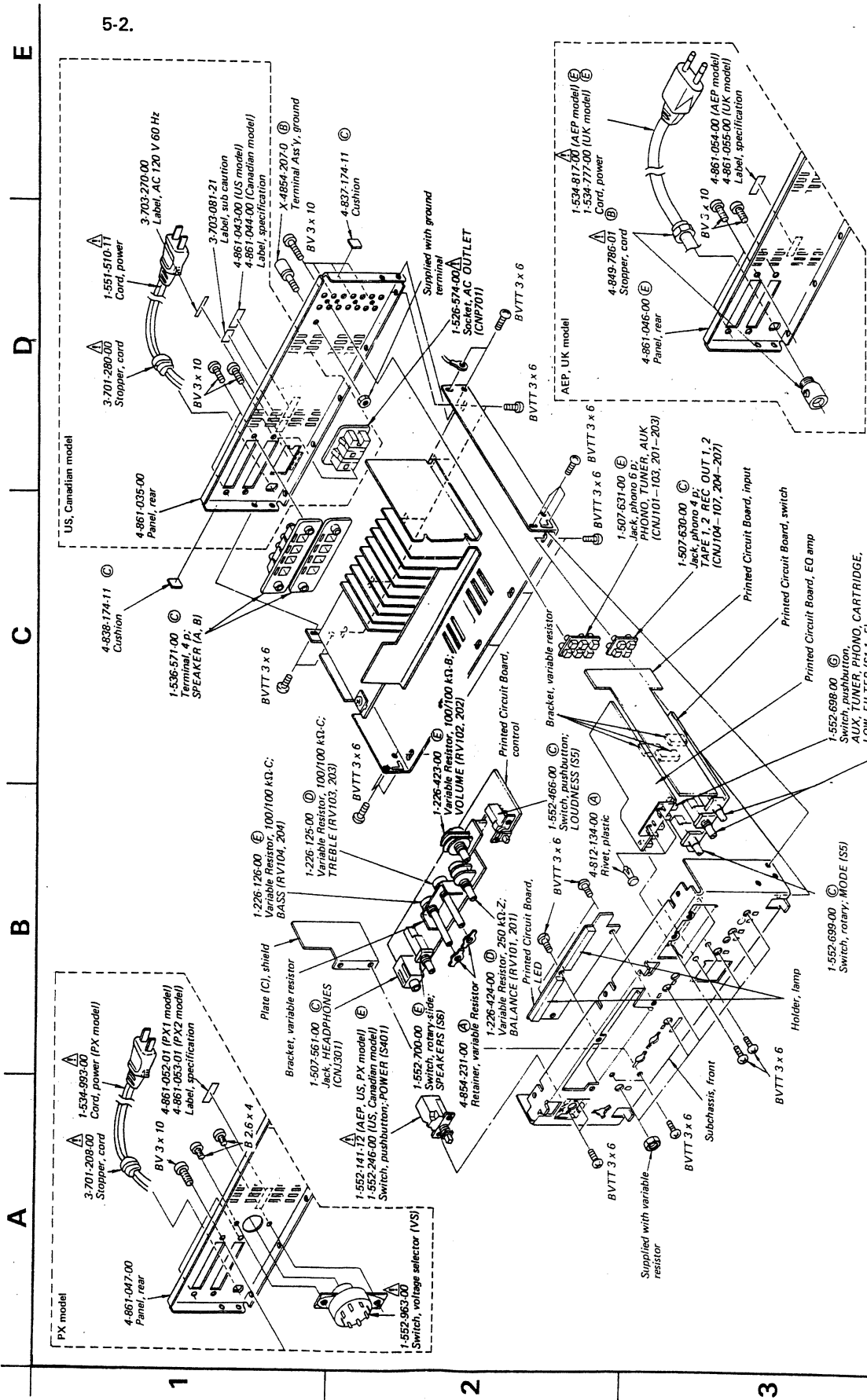
(Top view)

5-1.

Note:

- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
- (-) = slotted head
- Circled letters (Ⓐ to Ⓩ) are applicable to European models only.






SECTION 6

ELECTRICAL PARTS LIST

Note: Circled letters (A) to (Z) are applicable to European models only.

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
SEMICONDUCTORS		
Transistors		
Q101, 201 Q102, 202	8-729-354-52	(E) 2SC2545
⇒ Q103-105 ⇒ Q203-205	8-729-387-28	(B) 2SA872
⇒ Q106, 206	8-765-082-20	(C) 2SA896
⇒ Q107, 207	8-765-012-20	(C) 2SC1811
⇒ Q108, 208	8-729-663-47	(C) 2SC1364
⇒ Q109, 209 Q110, 210	8-729-612-77	(B) 2SA1027R
⇒ Q111, 211	8-729-663-47	(C) 2SC1364
Q112, 212	8-729-663-47	(C) 2SC1364
Q113, 213	8-729-397-22	(I) 2SA1097
Q114, 214	8-729-371-22	(G) 2SC2571
⇒ Q115, 215	8-729-663-47	(C) 2SC1364
⇒ Q301	8-729-663-47	(C) 2SC1364
⇒ Q302	8-729-612-77	(B) 2SA1027R
Q303-305	8-729-663-47	(C) 2SC1364
Q401	8-729-203-04	(B) 2SK30A
⇒ Q402	8-729-663-47	(C) 2SC1364
Q403	8-729-141-43	(B) 2SD414
⇒ Q404	8-729-612-77	(B) 2SA1027R
⇒ Q405	8-729-663-47	(C) 2SC1364
Q406	8-729-141-43	(B) 2SD414
Q407	8-729-203-04	(B) 2SK30A
⇒ Q408	8-729-612-77	(B) 2SA1027R
Q409	8-729-154-83	(B) 2SB548
⇒ Q410	8-729-663-47	(C) 2SC1364
⇒ Q411	8-729-612-77	(B) 2SA1027R
⇒ Q412	8-765-082-20	(C) 2SA896
⇒ Q413	8-729-612-77	(B) 2SA1027R
⇒ Q901	8-729-612-77	(B) 2SA1027R
Q902	8-729-663-47	(C) 2SC1364
⇒ Q903-906	8-729-308-41	2SC1986D (US, Canadian model)
Q903, 904	8-729-384-31	(F) MN8301C (AEP, UK, PX model)


⇒: Due to standardization, interchangeable replacements may be substituted for parts specified in the diagrams.

Note: The components identified by shading and mark  are critical for safety. Replace only with part number specified.






<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
ICs		
IC101, 201	8-759-314-57	(C) HA1457
IC102, 202	8-751-710-00	(H) CX171
⇒ IC103, 203	8-759-145-58	(D) μPC4558C
IC104, 204	8-759-924-06	(G) 1R2406
Diodes		
D101, 201	8-719-815-55	(B) 1S1555
D102, 202	8-719-912-00	(B) MV12N
D103, 203	8-719-923-76	(B) 1S2076A
D104, 204	8-719-912-00	(B) MV12N
D105, 205	8-719-923-76	(B) 1S2076A
⇒ D106, 206	8-719-422-21	(B) 1T22AM
D107, 207	8-719-815-55	(B) 1S1555
D108, 208	8-719-912-00	(B) MV12N
D109, 209	8-719-910-40	(B) MV104V
⇒ D110, 210	8-719-815-55	(B) 1S1555
D111, 211	8-719-388-03	(H) SEL8803
D112, 212	8-719-815-55	(B) 1S1555
D301	8-719-815-55	(B) 1S1555
D302	8-719-920-30	(B) MV203V
⇒ D303	8-719-931-30	(B) EQB01-30
D304, 305	8-719-815-55	(B) 1S1555
D306-309	8-719-310-30	(C) SEL103W
D310	8-719-920-30	(B) MV203V
⇒ D401, 402	8-719-931-20	(B) EQB01-20
⇒ D403-406	8-719-911-55	(B) U05G
D407	8-719-815-55	(B) 1S1555
D901, 902	8-719-815-55	(B) 1S1555
⇒ D903, 904	8-719-300-22	(D) CTU22U
D905	8-719-903-09	V30N(PX model)

COILS AND TRANSFORMERS

L101, 201	1-407-519-00	(B) Microinductor
L901-905	1-421-329-00	(B) Coil, choke
T901	1-421-328-00	Line Filter (US, Canadian model)

Note: Les composants identifiés par un tramé et une marque  sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.


Note: Circled letters (A) to (Z) are applicable to European models only.


Ref. No.	Part No.	Description
T901	 1-421-340-00 (E)	Line Filter (AEP, UK, PX model)
T902-905	 1-543-100-00 (B)	Core (US, Canadian model)
T904, 905	 1-543-100-00 (B)	Core (AEP, UK, PX model)
T906	 1-446-333-00	Transformer, converter (US, Canadian model)
T906	 1-446-390-00 (L)	Transformer, converter (AEP, UK, PX model)


CAPACITORS

All capacitors are in μF and ceramic unless otherwise noted.
50 WV or less are not indicated except for electrolytics.
pF : μF , elect : electrolytic

C101	1-161-319-00 (A)	470 p		
C102, 202	1-102-973-00 (A)	100 p		
C103, 203	1-131-238-00 (B)	10	25 V	tantalum
C104, 204	1-121-414-00 (B)	100	10 V	elect
C105, 205	1-123-067-00 (C)	2200	25 V	elect
C106, 206	1-131-218-00 (B)	3.3	35 V	tantalum
C107, 207	1-121-422-00 (B)	220	25 V	elect
C108, 208	1-161-316-00 (A)	270 p		
C109, 209	1-130-205-00 (C)	0.056	630 V	film
C110, 210	1-130-206-00 (B)	0.016	630 V	film
C111, 211	1-161-317-00 (A)	330 p		
C112, 212	1-123-232-00 (B)	4.7	50 V	elect (nonpolarized)
C113, 213	1-131-214-00 (B)	0.68	35 V	tantalum
C114, 214,	1-121-738-00 (B)	10	50 V	elect
C115, 215				
C116, 216	1-108-251-00 (B)	0.1		mylar
C117, 217	1-161-317-00 (A)	330 p		
C118, 218	1-123-228-00 (B)	1	50 V	elect (nonpolarized)
C119, 219	1-121-411-00 (B)	47	50 V	elect
C121, 221	1-161-257-00 (A)	6.8 p		
C123, 223	1-121-726-00 (B)	0.47	50 V	elect
C124, 224	1-102-117-00 (A)	820 p		
C125, 225	1-108-358-00 (B)	0.018		mylar
C126, 226	1-108-605-00 (B)	0.12		mylar
C127, 227,	1-121-738-00 (B)	10	50 V	elect
C128, 228				
C129, 229	1-108-581-00 (B)	0.012		mylar

Note: The components identified by shading and mark  are critical for safety. Replace only with part number specified.

Ref. No.	Part No.	Description
C130, 230	1-121-726-00 (B)	0.47 50 V elect
C151, 251	1-102-123-00 (A)	0.003
C152, 252	1-123-232-00 (B)	4.7 50 V elect (nonpolarized)
C153, 253	1-121-352-00 (B)	47 10 V elect
C154, 254	1-121-421-00 (B)	220 16 V elect
C155, 255	1-121-726-00 (B)	0.47 50 V elect
C156, 256	1-121-421-00 (B)	220 16 V elect
C157, 257	1-102-816-00 (A)	120 p
C158, 258	1-107-169-00 (B)	100 p 500 V silvered mica
C159, 259,	1-161-056-00 (A)	0.027 50 V (semiconductor)
C160, 260		
C161, 261	1-129-701-00 (B)	0.01 100 V film
C162, 262	1-107-169-00 (B)	100 p 500 V silvered mica
C164, 264	1-102-123-00 (A)	0.003
C166, 266	1-121-414-00 (B)	100 6.3 V elect
C167, 267	1-108-599-00 (B)	0.068 mylar (AEP, UK, model)
C167, 267	1-130-117-00	0.033 100 V film (US, Canadian, PX model)
C168, 268	1-121-450-00 (B)	2.2 50 V elect
C169, 269	1-121-395-00 (B)	4.7 25 V elect
C170, 270	1-121-726-00 (B)	0.47 50 V elect
C171, 271	1-161-261-00 (A)	15 p
C172, 272	1-108-599-00 (B)	0.068 mylar (AEP, UK model)
C301, 302	1-121-419-00 (B)	200 6.3 V elect
C401	1-121-396-00 (B)	4.7 50 V elect
C402	1-121-480-00 (B)	22 25 V elect
C403	1-121-388-00 (C)	1000 35 V elect
C404	1-121-416-00 (B)	100 25 V elect
C405	1-121-396-00 (B)	4.7 50 V elect
C406	1-121-480-00 (B)	22 25V elect
C407	1-121-388-00 (C)	1000 35 V elect
C408, 409	1-121-398-00 (B)	10 25 V elect
C410, 411	1-123-450-00 (G)	3300 50 V elect
C412, 413	1-121-411-00 (A)	47 50 V elect
C414	 1-125-180-00	1200 200 V elect (US, Canadian model)

Note: Les composants identifiés par un tramé et une marque  sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

Note: Circled letters (A to Z) are applicable to European models only.

Ref. No.	Part No.	Description
C414, 415	Δ 1-123-291-00 (H)	680 200 V elect (AEP, UK, PX model)
C415, 416	Δ 1-161-516-00	0.001 125 V (US, Canadian model)
C416, 417	Δ 1-161-734-00 (B)	0.0022 400 V (AEP, UK model)
C417	Δ 1-102-222-000	0.001 250 V (PX model)
C417	Δ 1-130-197-00	0.047 125 V film (US, Canadian model)
C418	Δ 1-130-342-00 (C)	0.47 300 V film (AEP, UK, PX model)
C419	Δ 1-123-303-00	6800 6.3 V elect
C901	Δ 1-130-141-00 (B)	0.01 630 V film
C902, 903	Δ 1-161-516-00	0.001 125 V (US, Canadian model)
C902, 903	Δ 1-161-734-00 (B)	0.0022 400 V (AEP, UK model)
C902, 903	Δ 1-102-222-00	0.001 250 V (PX model)
C904	Δ 1-123-401-00	47 200 V elect (US, Canadian model)
C904	Δ 1-123-402-00 (C)	22 400 V elect (AEP, UK, PX model)
C905	Δ 1-108-595-00 (B)	0.047 mylar
C906	Δ 1-108-599-00 (B)	0.068 mylar
C907, 908	Δ 1-123-539-00	4.7 200 V elect (US, Canadian model)
C907, 908	Δ 1-130-358-00	1.2 250 V (AEP, UK, PX model)
C909, 910	Δ 1-123-376-00 (C)	330 63 V elect
C911, 912	Δ 1-123-374-00 (B)	100 63 V elect
C913	Δ 1-130-141-00 (B)	0.01 630 V film
C914	Δ 1-123-359-00	47 50 V elect (PX model)
C915	Δ 1-161-734-00 (B)	0.0022 400 V (AEP, UK model)

Note: The components identified by shading and mark Δ are critical for safety. Replace only with part number specified.

Ref. No.	Part No.	Description
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RESISTORS

All resistors are in ohms. Common 1/4 W carbon resistors are omitted. Refer to the list on page 29 for the their part numbers. (k Ω : 1000 Ω , M Ω : 1000 k Ω)

R102, 202	1-244-853-00 (A)	150 1/2 W
R103, 203	1-213-131-00 (A)	100 1/2 W
R104, 204	1-244-921-00 (A)	100 k 1/2 W
R105, 205		
R108, 208	1-214-084-00 (A)	10 1/4 W (1 %) metal oxide
R109, 209	1-213-131-00 (A)	100 1/2 W
R110, 210	1-244-913-00 (A)	47 k 1/2 W
R111, 211	1-244-890-00 (A)	5.1 k 1/2 W
R112, 212	1-244-865-00 (A)	470 1/2 W
R117, 217	Δ 1-212-982-00 (B)	100 1/2 W fusible
R118, 218	1-214-130-00 (A)	820 1/4 W (1 %) metal oxide
R119, 219	1-214-174-00 (A)	56 k 1/4 W (1 %) metal oxide
R120, 220	1-214-142-00 (A)	2.7 k 1/4 W (1 %) metal oxide
R121, 221	1-214-139-00 (A)	2 k 1/4 W (1 %) metal oxide
R124, 224	1-244-913-00 (A)	47 k 1/2 W
R125, 225	1-244-873-00 (A)	1 k 1/2 W
R126, 226	1-244-921-00 (A)	100 k 1/2 W
R127, 227	1-244-913-00 (A)	47 k 1/2 W
R129, 229	1-244-892-00 (A)	6.2 k 1/2 W
R131, 231	1-244-873-00 (A)	1 k 1/2 W
R132, 232	1-244-942-00 (A)	750 k 1/2 W
R141, 241	1-244-906-00 (A)	24 k 1/2 W
R142, 242	1-244-908-00 (A)	30 k 1/2 W
R143, 243	1-244-885-00 (A)	3.3 k 1/2 W
R144, 244	1-244-861-00 (A)	330 1/2 W
R151, 251	1-244-915-00 (A)	56 k 1/2 W
R153, 253	1-244-857-00 (A)	220 1/2 W
R157, 257	1-244-885-00 (A)	3.3 k 1/2 W
R158, 258	1-244-857-00 (A)	220 1/2 W
R164, 264	Δ 1-212-988-00 (B)	180 1/2 W fusible
R168, 268	1-217-156-00 (B)	0.22 5 W wirewound
R170, 270	Δ 1-212-988-00 (B)	180 1/2 W fusible
R176	1-217-156-00 (B)	0.22 5 W wirewound
R177, 277	Δ 1-212-962-00 (B)	15 1/2 W fusible


Note: Les composants identifiés par un tramé et une marque Δ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

Note: Circled letters (A to Z) are applicable to European models only.

Ref. No.	Part No.	Description
R188, 281	1-244-829-00 (A) 15	½ W
R182, 282	1-244-825-00 (A) 10	½ W
R183, 283		
R184, 284	1-244-865-00 (A) 470	½ W
R311	1-206-656-00 (B) 470	2 W metal oxide (nonflammable)
R403	1-214-130-00 (A) 820	¼ W (1 %) metal oxide
R404	1-214-148-00 (A) 4.7 k	¼ W (1 %) metal oxide (nonflammable)
R407	1-206-709-00 (B) 220	3 W metal oxide (nonflammable)
R411	1-214-130-00 (A) 820	¼ W (1 %) metal oxide
R412	1-214-418-00 (A) 4.7 k	¼ W (1 %) metal oxide
R416	1-244-874-00	1.1 k ½ W carbon (US, Canadian model)
R416	1-244-880-00 (A) 3.3 k	½ W carbon (AEP, UK, PX model)
R417	1-214-176-00 (A) 68 k	¼ W (1 %) metal oxide
R418	1-205-598-00	33 5 W wirewound (US, Canadian model)
R418	1-205-599-00 (B) 75	5 W wirewound (AEP, UK, PX model)
R420	1-206-678-00	3.9 k 2 W metal oxide (nonflammable) (PX model)
R421	1-206-674-00	2.7 k 2 W metal oxide (nonflammable) (PX model)
R901	1-244-927-00 (A) 180 k	½ W (AEP, UK, PX model)
R901	1-246-515-00	82 k ¼ W (US, Canadian model)
R902, 903	1-246-483-00 (A) 2.7 k	¼ W
R904	1-246-507-00 (A) 27 k	¼ W
R905	1-246-469-00 (A) 680	¼ W
R906	1-244-827-00 (A) 12	½ W
RT101, 201	1-224-251-XX (B) 4.7 k-B,	adjustable; dc balance
RT102, 202	1-224-254-XX (B) 47 k-B,	adjustable; dc bias
RT103, 203	1-222-254-XX (B) 47 k-B,	adjustable, meter level
RV101, 201	1-226-424-00 (D) 250 k-Z,	variable, BALANCE
RV102, 202	1-226-423-00 (E) 100/100 k-B,	variable, VOLUME
RV103, 203	1-226-125-00 (D) 100/100 k-C,	variable, TREBLE
RV104, 204	1-226-126-00 (E) 100/100 k-C,	variable, BASS

SWITCHES

S1-1-5	1-552-698-00 (G) Pushbutton, AUX/TUNER/ PHONO/CARTRIDGE/LOW FILTER
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Note: The components identified by shading and mark  are critical for safety. Replace only with part number specified.


<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
S2	1-552-701-00 (E)	Rotary-slide, MONITOR
S3	1-552-701-00 (E)	Rotary-slide, TAPE COPY
S4	1-552-699-00 (E)	Rotary-slide, MODE
S5	1-552-466-00 (C)	Pushbutton, LOUDNESS
S6	1-552-700-00 (E)	Rotary-slide, SPEAKERS
S401	△ 1-552-141-12 (E)	Pushbutton, POWER (AEP, UK, PX model)
S401	△ 1-552-246-00	Pushbutton, POWER (US, Canadian model)
VS	△ 1-552-963-00	Voltage Selector (PX model)

JACKS

CNJ101-103	1-507-631-00 (E) Phono, 6 p; PHONO, TUNER, AUX
CNJ201-203	
CNJ104-107	1-507-630-00 (C) Phono, 4 p; TAPE 1, 2 REC OUT 1, 2
CNJ204-207	
CNJ301	1-507-561-00 (C) HEADPHONES

MISCELLANEOUS

CNP701	1-526-574-00 Socket, AC OUTLET (US, Canadian model)
F401	1-532-325-00 Fuse, T6.3A (PX model)
F401	1-532-350-00 (B) Fuse, T4A (AEP, UK model)
F401	1-532-509-00 Fuse, 6.3A (US, Canadian model)
F402	1-532-556-00 (B) Fuse, 2A; thermal
RY301	1-515-302-00 (F) Relay
RY302	1-515-278-00 Relay (US, Canadian model)
RY302	1-515-347-00 (F) Relay (AEP, UK, PX model)
RY901	1-515-349-00 Relay (PX model)
TM301, 302	1-536-571-00 (C) Terminal, 4 p; SPEAKER (A, B)
	1-517-072-00 Holder, fuse (US, Canadian model)
	1-533-131-00 (A) Holder, fuse (AEP, UK, PX model)
	1-534-777-00 (E) Cord, power (UK model)
	1-534-817-00 (E) Cord, power (AEP model)
	1-534-993-00 Cord, power (PX model)
	1-551-510-11 Cord, power (US, Canadian model)

Note: Les composants identifiés par un tramé et une marque  sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

Note: Circled letters (A to Z) are applicable to European models only.

ACCESSORIES AND PACKING MATERIALS

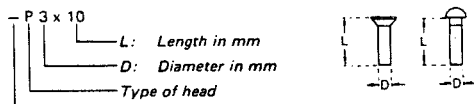
<u>Part No.</u>	<u>Description</u>
1-526-565-11	Adaptor, ac plug (PX1 model)
3-429-126-00	(B) Bag plastic
3-558-465-00	(B) Cushion
3-701-630-00	(A) Bag, plastic
3-701-730-00	(B) Bag, plastic
3-770-656-11	(D) Manual, instruction (AEP, UK, PX model)
3-770-656-21	Manual, instruction (US, Canadian model)
3-794-233-21	Card, instruction (US model)
3-794-495-31	Card, instruction; French (Canadian model)
4-861-056-00	(E) Carton

1/4 WATT CARBON RESISTORS (A)

Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.
1.0	1-246-401-00	10	1-246-425-00	100	1-246-449-00	1.0k	1-246-473-00	10k	1-246-497-00	100k	1-246-521-00	1.0M	1-246-545-00
1.1	1-246-402-00	11	1-246-426-00	110	1-246-450-00	1.1k	1-246-474-00	11k	1-246-498-00	110k	1-246-522-00	1.1M	1-210-814-00
1.2	1-246-403-00	12	1-246-427-00	120	1-246-451-00	1.2k	1-246-475-00	12k	1-246-499-00	120k	1-246-523-00	1.2M	1-210-815-00
1.3	1-246-404-00	13	1-246-428-00	130	1-246-452-00	1.3k	1-246-576-00	13k	1-246-500-00	130k	1-246-524-00	1.3M	1-210-816-00
1.5	1-246-405-00	15	1-246-429-00	150	1-246-453-00	1.5k	1-246-577-00	15k	1-246-501-00	150k	1-246-525-00	1.5M	1-210-817-00
1.6	1-246-406-00	16	1-246-430-00	160	1-246-454-00	1.6k	1-246-578-00	16k	1-246-502-00	160k	1-246-526-00	1.6M	1-210-818-00
1.8	1-246-407-00	18	1-246-431-00	180	1-246-455-00	1.8k	1-246-579-00	18k	1-246-503-00	180k	1-246-527-00	1.8M	1-210-819-00
2.0	1-246-408-00	20	1-246-432-00	200	1-246-456-00	2.0k	1-246-580-00	20k	1-246-504-00	200k	1-246-528-00	2.0M	1-210-820-00
2.2	1-246-409-00	22	1-246-433-00	220	1-246-457-00	2.2k	1-246-581-00	22k	1-246-505-00	220k	1-246-529-00	2.2M	1-210-821-00
2.4	1-246-410-00	24	1-246-434-00	240	1-246-458-00	2.4k	1-246-582-00	24k	1-246-506-00	240k	1-246-530-00	2.4M	1-244-754-00
2.7	1-246-411-00	27	1-246-435-00	270	1-246-459-00	2.7k	1-246-583-00	27k	1-246-507-00	270k	1-246-531-00	2.7M	1-244-755-00
3.0	1-246-412-00	30	1-246-436-00	300	1-246-460-00	3.0k	1-246-584-00	30k	1-246-508-00	300k	1-246-532-00	3.0M	1-244-756-00
3.3	1-246-413-00	33	1-246-437-00	330	1-246-461-00	3.3k	1-246-585-00	33k	1-246-509-00	330k	1-246-533-00	3.3M	1-244-757-00
3.6	1-246-414-00	36	1-246-438-00	360	1-246-462-00	3.6k	1-246-586-00	36k	1-246-510-00	360k	1-246-534-00	3.6M	1-244-758-00
3.9	1-246-415-00	39	1-246-439-00	390	1-246-463-00	3.9k	1-246-587-00	39k	1-246-511-00	390k	1-246-535-00	3.9M	1-244-759-00
4.3	1-246-416-00	43	1-246-440-00	430	1-246-464-00	4.3k	1-246-488-00	43k	1-246-512-00	430k	1-246-536-00	4.3M	1-244-760-00
4.7	1-246-417-00	47	1-246-441-00	470	1-246-465-00	4.7k	1-246-489-00	47k	1-246-513-00	470k	1-246-537-00	4.7M	1-244-761-00
5.1	1-246-418-00	51	1-246-442-00	510	1-246-466-00	5.1k	1-246-490-00	51k	1-246-514-00	510k	1-246-538-00	5.1M	1-244-762-00
5.6	1-246-419-00	56	1-246-443-00	560	1-246-467-00	5.6k	1-246-491-00	56k	1-246-515-00	560k	1-246-539-00		
6.2	1-246-420-00	62	1-246-444-00	620	1-246-468-00	6.2k	1-246-492-00	62k	1-246-516-00	620k	1-246-540-00		
6.8	1-246-421-00	68	1-246-445-00	680	1-246-469-00	6.8k	1-246-493-00	68k	1-246-517-00	680k	1-246-541-00		
7.5	1-246-422-00	75	1-246-446-00	750	1-246-470-00	7.5k	1-246-494-00	75k	1-246-518-00	750k	1-246-542-00		
8.2	1-246-423-00	82	1-246-447-00	820	1-246-471-00	8.2k	1-246-495-00	82k	1-246-519-00	820k	1-246-543-00		
9.1	1-246-424-00	91	1-246-448-00	910	1-246-472-00	9.1k	1-246-496-00	91k	1-246-520-00	910k	1-246-544-00		

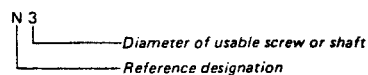
HARDWARE NOMENCLATURE

Screw:



Indicated slotted-head only.
Unless otherwise indicated, it means cross-recessed head (Phillips type).

Nut, Washer, Retaining ring:



Reference Designation	Shape	Description	Remarks
SCREWS			
P		pan-head screw	binding-head (B) screw for replacement
PWH		pan-head screw with washer face	binding-head (B) screw and flat washer for replacement
PS PSP		pan-head screw with spring washer	binding-head (B) screw and spring washer for replacement
PSW PSPW		pan-head screw with spring and flat washers	binding-head (B) screw and spring and flat washers for replacement
R		round-head screw	binding-head (B) screw for replacement
K		flat-countersunk-head screw	
RK		oval-countersunk-head screw	
B		binding-head screw	
T		truss-head screw	binding-head (B) screw for replacement
F		flat-fillister-head screw	
RF		fillister-head screw	
BV		brazer-head screw	

Reference Designation	Shape	Description	Remarks
SELF-TAPPING SCREWS			
TA		self-tapping screw	ex: TA, P 3 x 10
PTP		pan-head self-tapping screw	binding-head self-tapping (TA, B) screw for replacement
PTPWH		pan-head self-tapping screw with washer face	binding-head self-tapping (TA, B) screw and flat washer for replacement
PTTWH		pan-head thread-rolling screw with washer face	binding-head (B) screw and flat washer for replacement
SET SCREWS			
SC		set screw	
SC		hexagon-socket set screw	ex: SC 2.6 x 4, hexagon socket
NUT			
N		nut	
WASHERS			
W		flat washer	
SW		spring washer	
LW		internal-tooth lock washer	ex: LW3, internal
LW		external-tooth lock washer	ex: LW3, external
RETAINING RINGS			
E		retaining ring	
G		grip-type retaining ring	

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